|  |  |
| --- | --- |
| **Course title : Animal Science IV** | Full marks : 50 (40T + 10P) |
| Course No. : Sc. Ed. 449 | Pass marks : 14T + 4P |
| Nature of the course : Theoretical (T) & Practical(P)  Level : B.Ed. (4 Year) | Periods per week : 3T  Practical ( 3P) : 3pds/2weeks/gr. |
| Year : Fourth | Total Periods : 75 |

# 1. Course Description

This course consists of theoretical and practical sections. The theoretical part consist of developmental biology, animal physiology, molecular biology, animal diseases environmental issues and population control. The practical part consists of handling and operation of some laboratory equipments, identification, classification, preservation of animals and preparation of temporary and permanent slides of some animal parts included in the course content and anatomical studies. It also includes field visit to collect, identify, preserve the animal specimens and also to submit field report.

## 2. General Objectives

After the completion of this course the students will be able to:

* + Provide the students with the fundamental aspects of development in higher animals
  + Impart the knowledge on human physiology and diseases.
  + Acquaint the students with the measures for environmental management and conservation as well as for the population control.
  + Familiarize students with some important issues on molecular biology.
  + Familiarize students with practical aspects of Animal science such as identification of Animal specimens , handling of Laboratory equipment related to the contents of the practical, slide preparation of related animal parts, identification of animals and dissection of mammal.

**Part I: Theory**

3. Specific Objective and Contents

|  |  |
| --- | --- |
| **Specific Objectives** | **Contents** |
| * Define developmental biology * Define placenta * Describe different types of placenta * Discuss advancement over other types of placenta. | **Unit I: Animal Development** 5   * 1. Placenta   1.1.1. Definition  **1.1.** 2. Types of placenta  **1.1.3.** Advancement over other types of development |
| * Define Physiology. * Describe animal nutrition, nutrients and enzymes for digestion of nutrients. * Describe the process of respiration. * Discuss transport of respiratory gases. * Discuss different terms like Asphyxia, O2 deficiency, CO2 poisoning along with high altitude sickness, * Define circulation. * Discuss various factors regarding Blood circulation, BP Blood grouping, ECG etc. * Define nervous system. * Describe structure and function of brain, nerve impulse conduction , synapsis. * Describe homeostasis, acclimatization etc**.** | **Unit II: Physiology 25**  **2.1** Animal nutrition  **2.2.1** Types of Animal nutrition  2.2.1.2. nutritive substances, enzymes  2.2. Respiration  2.2.1. Respiratory pigments  2.2.2.Transport of respiratory gases  2.2.3. Asphyxia  2.2.4. O2 deficiency  2 .2.5.CO2 poisoning  2.2.6. High altitude sickness  2.2.7. Circulation  2.2.8. Heart sounds  2.2.9. Blood Pressure, Pulse pressure  2.2.10. Blood grouping  2.2.11. ECG, Heart attack  2.3. Nervous system  2.3.1. Types of nervous system of man  2.3.2. Brain  2.3.3. Conduction of nerve impulse  2.3.4. Synapses  2.3.5. Thermoregulation  2.3.6. Acclimatization  2.3.7. homeostasis |
| * Explain the process of soil formation * Explain different constituents of soil * Describe different types and profile of soil * Explain different types of soil organisms * Explain different types of animal relationships with examples * Define parasitism * Describe different types of parasites and parasitic adaptations * Explain mutualism and commensalism * Explain Proto Cooperation. * Explain the meaning of demography * Discuss demographic terms. * Discuss causes and consequences of over population. * Discuss family planning and control of over population. | **Unit III: Animal Ecology15**  **3. 1. Soil**  3.1.1. Soil formation   * + 1. Soil constituents     2. Soil types, Soil profile     3. Soil organisms   1. Animal Relationships      1. Antagonism   3.2..2. Parasitism   * + 1. Kinds of parasites     2. Parasitic adaptations     3. Mutualism     4. Commensalism     5. Proto Cooperation   3.3.**Animal Population**   * + 1. Meaning of demography     2. Demographic terms     3. Growth curves     4. Causes of overpopulation     5. Consequences of overpopulation     6. Family Planning techniques |
| * Explain communicable diseases with examples * Discuss importance of socially significant diseases and their impacts. * Describe non communicable diseases with examples. | **Unit IV: Animal diseases 05**   * 1. Communicable diseases      1. Tuberculosis      2. Ascariasis   2. Non communicable diseases      1. Cancer      2. Socially significant diseases      3. Smoking      4. Alcoholism      5. Drug addiction |
| * Discuss various issues regarding environment and its conservation. * discuss park people interaction and Buffer zone * Explain the role of King Mahendra Trust. * Explain the role of cites. * Explain role of eco-tourism. * Explain role of institutions like IUCN in conservation. * Discuss law for conservation, use of different strategies for conservation of wild life. * Explain the importance of biopesticide and biofertilizer. * Discuss the hazardous brought by chemical fertilizers. | **Unit V: Environment 10**   * 1. . Park people interaction   5.2. Concept of Buffer zone  5.3. King mahendra trust  5.4. Cites  5.5. Eco tourism  5.6. Strategies in conservation of wild life  Law  5.7. Biopesticide, Biofertilizer  5.8. Environmenta hazard due to chemical  fertilizer |
| * Define Aging * Explain life span and life expectancy * Explain mechanism of aging and their impacts * Describe age related changes in the brain in the old age * Define Apotosis * Discuss the importance of apoptosis with their defects * Describe the physiology of apoptosis and its regulatory mechanism * Define caspases * Describe the influence of caspases on the development, self-proliferation and cell cycle regulation. * Explain molecular basis of cancer * Explain viruses and cancer * Classify Proto-oncogenes * Explain tumour suppressor genes * Explain Metastasis | **Unit VI: Molecular Biology15**   * 1. Aging      1. Introduction      2. Life span and life cycle expectancy      3. Mechanism of aging      4. Impact of aging   2. Programmed Cell Death   6.2.1.Introduction  6.2.2. Importance of apoptosis  6.2.3. Physiology of apoptosis  6.2.4. Process & regulation of apoptosis  6.2.5. Caspases  6.2.6. Apotosis and disease  **Biology of Cancer Cells**  6.1. Introduction  6.2. Molecular basis of cancer  6.3. Viruses and cancer  6.4. Classification of Proto-oncogenes  6.5. Tumour suppressor genes  6.6. Metastasis |

4. .**Instructional Techniques**

The instructional techniques for this course are divided into two parts. First part deals with general instructional techniques applicable to most of the units. The second part pin points the specific instructional techniques applicable to particular unit/s.

4.1 **General Instructional Techniques**

* Lecture method
* Discussion method
* Demonstration method
* Problem solving method
* Collaborative method
* Experimental method
  1. **Specific Instructional Techniques**

Unit IV and V : Project method with report writing

1. Evaluation

Students are required to secure pass marks independently both in Theory and Practical sections.

**Part I: Theory**

Annual examination will be held by the Office of the Controller of Examinations at the end of the academic session for which 40 percent of total marks will be allocated. The number and types of questions are given below:

|  |  |  |  |
| --- | --- | --- | --- |
| Types of questions | Total questions  to be asked | Number of questions  to be answered and marks allocated | Total marks |
| Group A: Multiple choice items | 7questions | 7x 1 mark | 7 |
| Group B: Short answer questions | 3 with 1 or questions | 3 x 7 | 21 |
| Group C: Long answer questions | 1 with 1 or question | 1 x 12 marks | 12 |
|  |  | Total | 40 Marks |

**Recommended Books for Theory Part**

1. Adhikari,S., Sinha A.K., and Ganguly B.B. (2012). *Biology of Animals: Volume II* (7th Ed), New Central Book Agency 8/1 Chintamonidas Lane, Calcutta 700009, India.
2. Dubey, R.C. (2015). *A Text Book of Biotechnology* (5th Revised Ed), S. Chand & Company Ltd
3. Gupta P.K. (2005). *Genetics.* Rastogi Publication, Shavaji Road, Meerut.
4. Jordan E.L. and Verma P.S. (2013). *Chordate Zoology* (14th Ed)*,* S. Chand & Company Ltd.
5. Rastogi S.C. (2011). *Molecular Biology,* CBS Publishers and Distributers Pvt. Ltd.

**Part II : Practical**

|  |  |
| --- | --- |
| **Specific Objectives** | **Contents** |
| * To determine the texture of soil | **Unit I Texture of soil** |
| * To study the permanent slides of development | **Unit II study slides of development of placental animals** |
| * To develop skill conducting physiological experiment | **Unit III test the enzymatic action on saliva and observation of presence of vitamin C in citrus fruits** |
| * To develop skill in conducting physiological experiment | **Unit IV: Animal Physiology**  Measurement of BP  Detection of Blood group |
| * To dissect rat to study alimentary canal, arterial and venous system, brian and cranial nerves etc | **Unit V Dissect the animal to expose**   1. alimentary canal 2. arterial system 3. venous system 4. brain 5. cranial nerves |
| * To visit animal farming for report writing | **Unit VII**  Field visit to animal farming  Report writing |

**Evaluation :**

Annual examination will be held by the Office of the Controller of Examinations at the end of the academic session. The marks allocated to practical part are given in the following table.

|  |  |  |  |
| --- | --- | --- | --- |
| Practical Examination | Area of Examination | Marks | Total |
| Internal | Regularity | 1 | 2 |
| Record book | 1 |
| External | Major Experiment | 2 | 8 |
| Minor Experiment | 2 |
| Project work , collection and construction of teaching materials | 2 |
| Viva | 2 |

**Recommended Books for Practical**

1. Lal S.S. (2015). *A Text Book of Practical Zoology Vertebrate* (11th Revised Ed), Published by Rastogi Publications, Meerut-250002, India
2. Verma P.S., (2010). *A Manual of Practical Zoology*, Chordates, Published by S. Chand and Company Ltd., Ram Nagar, New Delhi 110055, India
3. Zobel D.B., Jha P.K., Behan M.J., and Yadab U.K.R. (1987). *A Practical Manual for Ecology*, Published by Ratna Book Distributors, Bag Bazaar, Kathmandu, Nepal

Reference:

1. Aggarwal B. S. and Aggarwal .A. P. (2003). *A Hand Book of Practical Zoology.* S.Chand and Company Ltd., New Delhi, India.